CLAIMS

1. A method for determining geometric errors of a rotary encoder with a plurality of increments that can be registered by a sensor, said encoder being for an internal combustion engine and being mounted on a shaft which can be directly or indirectly set in motion by gas moments and moments of inertia,

   characterised in that the profile of the angular velocity $\omega_{mess}(t)$ is measured for a time-variable shaft speed, that the shaft speed signals obtained during said measurement are averaged and that said averaging process is carried out within a shaft speed range in which the effects of the gas moments and moments of inertia, which act on the shaft in the internal combustion engine, on the angular velocity of the crankshaft cancel each other out statistically, at least to a great extent and that geometric errors of the rotary encoder are determined on the basis of the profile of the angular velocity $\omega_{mess}(t)$.

2. The method according to claim 2,
   characterised in that a mean angular velocity ϖ_n per shaft rotation (n) is calculated at least approximately on the basis of the measured profile of the angular velocity $\omega_{mess}(t)$.

3. The method according to claim 2,
   characterised in that an increment(z)-related angular velocity $\varpi_R(z)$ is calculated at least approximately from the mean angular velocity ω_R..

4. The method according to claim 3,

characterised in that the increment(z)-related angular velocity $\omega_n(z)$ is calculated from at least two calculated mean angular velocities ϖ_{n-1} and ϖ_{n+1}.

5. The method according to claim 3 or 4, characterised in that the profile of the increment(z)-related angular velocity $\omega_n(n)$ is at least approximated by a polynomial.

6. The method according to claim 5, characterised in that the increment(z)-related angular velocity $\omega_n(z)$ is obtained as a function value of the function described by the polynomial.

7. The method according to any one of claims 1 to 4, characterised in that the averaging is a linear averaging which is carried out over the increment(z)-related angular velocities $\omega_n(z)$ per increment (z) and shaft rotation (n) on the basis of the following relationship which gives an incremental angular error per rotation as geometric error:

$$\Delta\varphi_{e_n}(z) = \frac{1}{k-l}\sum_{n=1}^{k}\left[\frac{\omega_n(z)}{f(z)} - \Delta\varphi_i(z)\right]$$

where $\Delta\varphi_{en}(z)$	incremental angular error per rotation
$\omega_n(z)$	incremental angular velocity per rotation
$f(z)$	increment frequency
$\Delta\varphi_i(z)$	angular increment for ideal increment
k, l	rotation indices for lower and upper speed limit

8. The method according to any one of claims 1 to 7, characterised in that the time-variable shaft speed is obtained as part of a coast-down, towing or compression test.

9. The method according to any one of claims 1 to 8, characterised in that the speed range within which the effects of the gas moments and moments of inertia on the shaft speed cancel each other out statistically, at least to a great extent, is selected such that initially that surge speed is sought for which a phase shift occurs in the shaft speed signal caused by a change in dominance between gas moments and moments of inertia, and that the speed range is selected about this surge speed such that an alternating component obtained in the speed signal is as small as possible after its averaging.

10. The method according to claim 6, characterised in that the speed range within which the effects of the gas moments and moments of inertia on the shaft angular velocity cancel each other out statistically, at least to a great extent, is selected such that the incremental angular error $\Delta\varphi_{en}(z)$ is determined as a function of the speed and that that speed range in which the angular error is smallest is selected.

11. The method according to any one of claims 1 to 7, characterised in that in the case of an internal combustion engine having an odd number of cylinders, an arbitrary speed range is used to measure the angular velocity when determining the geometric error.

12. A method for compensating for geometric errors of a rotary encoder with a plurality of increments that can be registered by a sensor, said encoder being for an internal combustion engine and being mounted on a

shaft which can be directly or indirectly set in motion by gas moments and moments of inertia,

characterised in that the geometric error is determined according to any one of claims 1 to 11 and the incremental angular geometric error $\Delta\varphi_{en}(z)$ thus obtained is used for correction when determining the speed of the internal combustion engine.